

APPENDIX F

GENERAL TRAINING REQUIREMENTS FOR ALL X-RAY OPERATORS

The department may use interview, observation and/or testing to determine compliance. The following are areas in which an individual shall have expertise for the competent operation of X-ray equipment:

1. Fundamentals of radiation safety.
 - a. Characteristics of X-radiation.
 - b. Units of radiation dose (mrem).
 - c. Hazards of exposure to radiation.
 - d. Levels of radiation from sources of radiation.
 - e. Methods of controlling radiation dose.
 - (1) Working time.
 - (2) Working distance.
 - (3) Shielding.
 - (4) Collimation.
 - (5) Filtration.
 - (6) Gonad shielding and other patient protection devices.
 - (7) Restriction of X-ray beam to the image receptor.
 - (8) Grid utilization.
 - (9) Utilization of mechanical immobilization device.
2. Familiarization with equipment.
 - a. Identification of controls.
 - b. Function of each control.
 - c. How to use a technique chart.
3. Film processing.
 - a. Film speed as related to patient exposure.

- b. Film processing parameters.
 - c. Quality assurance program.
- 4. Emergency procedures.
 - a. Termination of exposure in event of automatic timing device failure.
- 5. Proper use of personnel dosimetry.
 - a. Location of dosimeter.
 - b. Interpretation of personnel monitoring reports.
- 6. Anatomy and positioning.
 - a. Relevant human anatomy.
 - b. Relevant human physiology.
 - c. Radiographic positioning.
- 7. The requirements of pertinent federal and state rules.
- 8. The licensee's or registrant's written operating and emergency procedures.

APPENDIX G

The following are individuals that qualify for training exemptions, approved Allied Health professions which qualify for cross-training into diagnostic X-ray as a limited diagnostic operator and individuals who may order diagnostic X-rays to be taken by a limited diagnostic operator outside the scope of procedures in appendix I:

1. Individuals exempt from minimum training requirements in subparagraph b of paragraph 2 of subdivision a of subsection 1 of section 33-10-06-03.
 - a. Medical doctors.
 - b. Chiropractors.
 - c. Doctors of osteopathy.
 - d. Podiatrists.
2. Prerequisite qualification: Individuals who qualify for cross-training as a limited diagnostic operator.
 - a. Nurse practitioner, registered nurse, licensed practical nurse.
 - b. Emergency medical technician paramedic.
 - c. Physical therapist, physical therapy assistant.
 - d. Occupational therapist, occupational therapy assistant.
 - e. Medical technologist, medical lab technician, clinical lab technician.
 - f. Physician assistant.
 - g. Orthopedic physician assistant.
3. Individuals who may order emergency X-ray examinations outside the scope of procedures in appendix I to be taken by limited diagnostic operators:
 - a. Medical doctor.
 - b. Doctor of osteopathy.
 - c. Physician assistant.
 - d. Nurse practitioner.

e. Chiropractor.

APPENDIX H

Limited Diagnostic Operator Training Requirements

Students must meet the prerequisite requirements of item 1 of subparagraph b of paragraph 2 of subdivision a of subsection 1 of section 33-10-06-03 and complete the training requirements of this appendix.

Training requirements have been divided into two sections, didactic instruction and clinical experience/supervision. Upon completion of didactic training, the individual must complete the clinical experience requirements of either subdivision a or b of subsection 2 and demonstrate competence for examinations listed in appendix I. Records must be maintained to demonstrate compliance with these requirements.

1. Didactic instruction section: Individuals shall complete a minimum of eighty hours of didactic training at a single course providing the minimum hours of instruction in the subjects below. Correspondence coursework cannot exceed twenty percent of the eighty-hour course (sixteen hours maximum). The course content should approximate the outline below. The eighty-hour course is subject to department approval. Individuals must also complete the three-hour self study course designed by the state health department. An examination is required to demonstrate successful completion of a course.
 - a. Basic X-ray Physics 12 hrs.
 - general description of production of X-rays
 - function of filtration and effects it has on X-ray beam
 - collimation
 - types and function of beam limiting devices
 - design, features and function of X-ray tube
 - b. Radiobiology 1 hr.
 - effects of ionizing radiation to the human body
 - factors that cause somatic and genetic damage
 - c. Radiation Protection 6 hrs.
 - ALARA concept
 - shielding materials
 - radiation quantity and units of measurement
 - basic interactions of X-ray with matter
 - primary and secondary scatter
 - importance of time, distance, shielding
 - maximum permissible dose-occupational/public

- latency period
- patient protection

d. Principles of Exposure 15 hrs.

- factors that control and influence radiographic quality
- properties of X-rays
- size distortion caused by geometric parameters
- parameters which cause shape distortion
- technique factor selection
- 15% rule, mAs and kVp relationship
- grid-types, ratios, and how they affect image quality
- intensifying screens
- X-ray film
- artifacts
- inverse square law

e. Darkroom Procedure and Processing 4 hrs.

- film storage and handling
- film processing and troubleshooting
- design, features and function of a processor
- silver recovery
- quality assurance/quality control

f. Anatomy and Positioning

- | | |
|--------------|--------|
| 1. Chest | 4 hrs. |
| 2. Abdomen | 4 hrs. |
| 3. Extremity | 8 hrs. |
| 4. Spine | 8 hrs. |
| 5. Skull | 8 hrs. |

2. Clinical experience/supervision section. Individuals must complete either a or b below. If the individual is unable to demonstrate clinical competence in a procedure due to a lack of opportunity, the student shall complete the three prerequisite examinations required by appendix J using simulation for subdivisions a through k of subsection 1 of appendix J. Final demonstration of competence in subdivisions a through s of subsection 1 of appendix J should be completed as soon as there is a patient requiring the procedure. No individual may perform

an unsupervised procedure for which they have not successfully completed the final demonstration of competence.

- a. The individual must complete three months of clinical training during which time they may perform X-ray examinations only under direct supervision.
 - (1) Direct supervision and evaluation of competence shall be performed by a general diagnostic operator or a limited diagnostic operator with two years' experience.
 - (2) The individual shall utilize proper procedure as indicated in appendix J.
 - (3) The individual shall be evaluated on procedure, performance and competency on forms provided by the department for each of the examinations listed in appendix I; or
- b. Individuals must complete at least one hundred twenty hours of clinical training at a facility where there is routinely fifty or more limited diagnostic X-ray examinations performed per week. During this time they may perform X-ray examinations only under direct supervision. After completing the one hundred twenty hours of training, the individual must complete an additional three-month probationary training period as outlined in number 4 of this part.
 - (1) Direct supervision and evaluation of competence shall be performed by a general diagnostic operator or a limited diagnostic operator with a two years experience.
 - (2) The individual shall utilize proper procedure as indicated in appendix J.
 - (3) The individual shall be evaluated on procedure performance and competency on forms provided by the department for each of the examinations listed in appendix I.
 - (4) Upon completion of one hundred twenty clinical hours and demonstration of competence in accordance with appendix J for limited diagnostic operator examinations:
 - (a) Individuals must complete a three-month probationary training period during which time they may independently perform limited diagnostic operator examinations for the procedures which they have successfully demonstrated competence.
 - (b) During the three-month probationary training, a general diagnostic operator, or a limited diagnostic operator with

two years' experience, or a radiologist must evaluate all films and conduct at least six hours of direct supervision on a weekly basis and give feedback on any needed improvements.

- [1] All films, including repeat and waste films, must be kept for evaluation.
- [2] Evaluation must be done on forms supplied by the department.

APPENDIX I

Specific examinations that are allowed in the scope of practice for limited diagnostic operators.

Chest:	PA, lateral, decubitus
Ribs:	AP, PA, obliques
Abdomen:	KUB, upright abdomen
Hand & fingers:	PA, lateral, oblique
Wrist:	PA, lateral, oblique
Forearm:	AP, lateral
Elbow:	AP, lateral
Humerus:	AP, lateral
Shoulder:	AP, internal & external rotation
Clavicle:	AP, AP axial
Pelvis:	AP
Hips:	AP, Frog leg lateral, cross-table lateral
Femur:	AP, lateral
Knee:	AP, lateral
Tibia-Fibula:	AP, lateral
Ankle:	AP, lateral, obliques
Foot & toes:	AP, lateral, obliques
Sinuses:	Water's, lateral
Skull:	AP/PA, lateral
Facial bones:	PA, lateral
C-spine:	AP, lateral, odontoid, (not trauma), swimmer's (not trauma)
T-spine:	AP, lateral, swimmer's (not trauma)
L-spine:	AP, lateral, L5-S1 lateral

Any situation deemed an emergency and requiring a limited diagnostic operator to conduct procedures not specifically listed above, requires a written order from an individual listed in part 3 of appendix G and direct supervision from the individual ordering the examination in accordance with item 1 of subparagraph c of paragraph 2 of subdivision a of subsection 1 of section 33-10-06-03.

APPENDIX J

X-ray Procedure and Image Competency Criteria

An individual must perform at least three examinations prior to requesting a final competency evaluation for each of the limited scope examinations listed in appendix I. The three preevaluation examinations should be on actual patients but may be simulated if there is an insufficient number of patients requiring the procedure during the students clinical competency training period. The evaluations shall be documented on forms provided by the department. The final competency evaluation must be on an actual patient. To pass a final competency evaluation, the individual must receive an acceptable rating in each of the criteria listed below.

1. At a minimum, the following criteria must be evaluated during a procedure and image competency evaluation involving an actual patient. Simulated procedures need to evaluate only subdivisions a through k below:
 - a. Select appropriate film size.
 - b. Select appropriate technique.
 - c. Use correct source-to-image distance.
 - d. Establish proper direction of central ray.
 - e. Execute proper patient position.
 - f. Collimate if appropriate.
 - g. Provide gonadal shielding if appropriate.
 - h. Use correct film markers.
 - i. Give proper patient instruction.
 - j. Place patient information correctly on the film.
 - k. Complete examination in an acceptable time limit.
 - l. All anatomical parts included on the film.
 - m. Correct positioning of anatomical parts.
 - n. Appropriate contrast.
 - o. Adequate density.
 - p. Correct use of right and left markers.

- q. Proper accessory markers as needed.
 - r. No visible motion.
 - s. Patient information correct and clearly visible.
2. If the individual is unable to demonstrate clinical competence while completing the requirements for clinical supervision in either subdivision a or b of subsection 2 of appendix H due to a lack of opportunities to conduct certain procedures, the student shall complete the three prerequisite examinations using simulation for subdivisions a through k of subsection 1. Final demonstration of competence in subdivisions a through s of subsection 1 should be completed as soon as there is a patient requiring the procedure. No individual may perform an unsupervised procedure for which they have not successfully completed the final demonstration of competence.

APPENDIX K
Training exemption and demonstration of competence for individuals
with greater than two years experience

After six months from the effective date of this regulation, limited diagnostic operators meeting the requirements of this regulation in accordance with this appendix may only perform procedures in the examinations in which they have successfully demonstrated competence. Prior examinations are not necessary for demonstrating competence in accordance with this appendix.

1. Training exemption.

Individuals who have completed two years of experience prior to the effective date of this regulation and have not attended an eighty-hour didactic training program as identified in item 2 of subparagraph b of paragraph 2 of subdivision a of subsection 1 of section 33-10-06-03 are exempt from completing the eighty-hour didactic training if they can demonstrate they have completed at least eighty hours of relevant X-ray training regardless of the length of the individual training session prior to the effective date of this regulation; and

2. Demonstrate competence in accordance with this appendix as follows:

- a. Competence shall be determined by a general diagnostic operator on forms provided by the department; and
- b. Competence shall include successful demonstration of items 1 a through s of appendix J for all procedures listed in appendix I.